APPENDIX J

HORIZONTAL DIRECTIONALLY DRILLED (HDD) CONDUIT INSTALLATION

TYPICAL BEACH APPROACH

Execution & Implementation Plan

CHERRINGTON

Execution & Implementation Plan

Land and Ocean Survey

For this drilling project, a comprehensive land and ocean floor survey, with a detailed profile and plan drawing, will be required. The survey must be complete with accurate horizontal distances from precise physical locations from known points on shore. These critical distances should be obtained using an EDM (Electronic Distance Measurement). A hub should be placed at the entry point. In addition, a minimum of one back-sight and one foresight hub should be placed a minimum of 100 feet from the entry point, on the proposed centerline of the bore. The ocean floor topography must be accurate from the shoreline to a point approximately 100 feet beyond the proposed exit point.

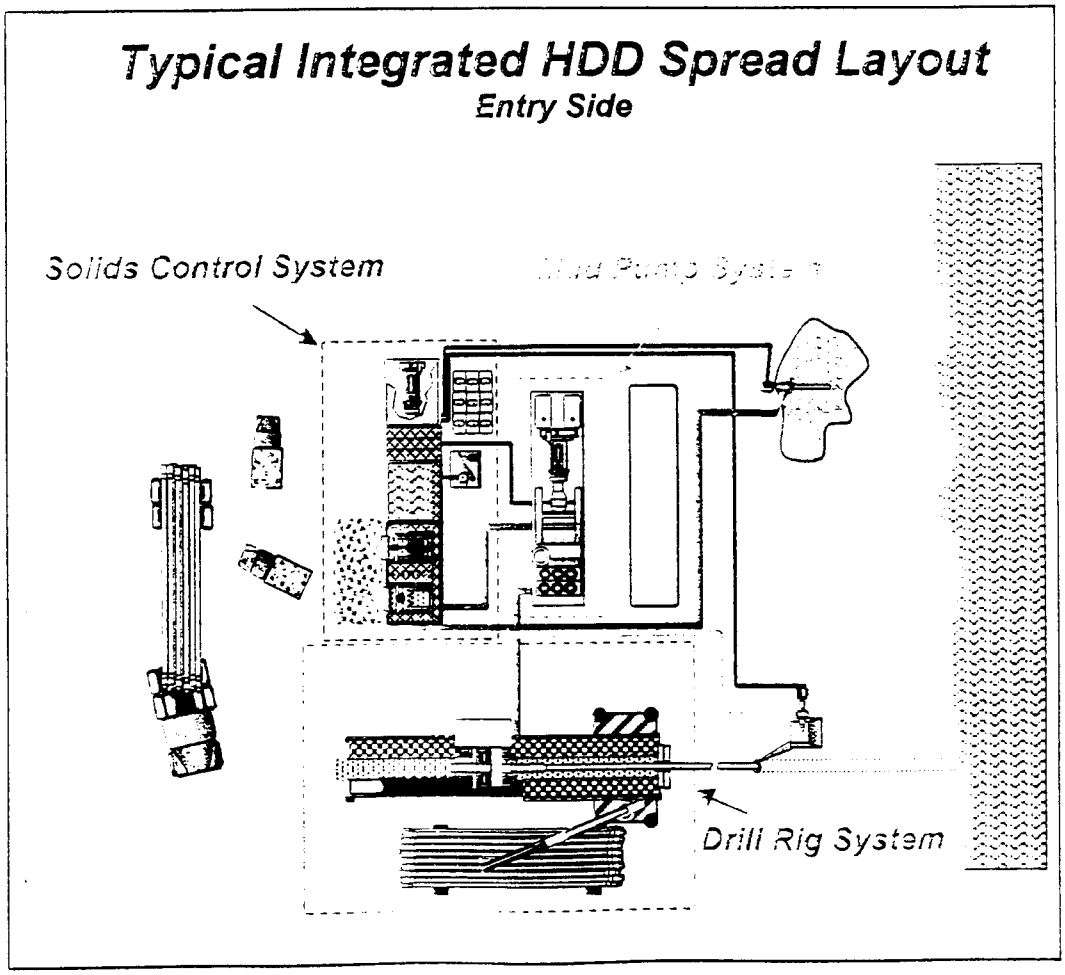
Ideally, core samples should be taken at approximately 500-foot intervals between the entry and exit points.

Cherrington recommends the area where the drilling rig and auxiliary equipment are to be positioned be relatively flat and without obstructions, such as large trees and dense brush.

The following is an example drawing that illustrates the typical area needed to set up the drilling equipment.

Typical Set-Up

The ideal drill staging requires an area of approximately 150' (46m) x 100' (31m). However, if necessary, Cherrington's equipment can be set up in a smaller staging area if overall space becomes a problem. See Model 25/75 Drill Rig specification sheet and Integrated Solids Control Systems specification sheet at Attachments 1 & 2.

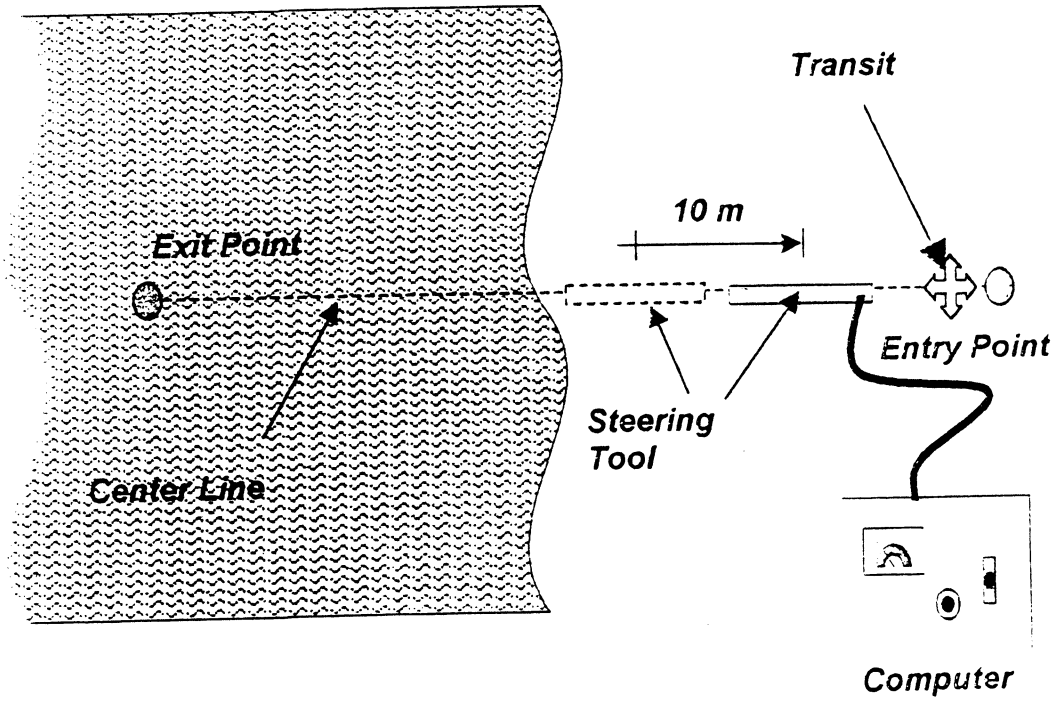


Wire Line Steering Tool Survey

The directional heading (azimuth) must be taken on the proposed alignment of the crossing. All ferrous objects need to remain at a safe distance from the alignment area. The in-hole steering tool used for guidance uses magnetometers to establish a magnetic heading.

The steering tool is placed on the alignment of the crossing near the entry point facing the exit point. Once on this alignment, the steering probe is energized with electrical current and a magnetic bearing for the project is established and logged into the surface computer. This process defines the foresight bearing. The steering tool is then placed within a non-magnetic bottom hole assembly (BHA). The BHA is composed of 30-foot sections of drill collars made of a non-magnetic material such as stainless steel. See Tensor® Steering Tool Systems specifications sheet at Attachment 3.

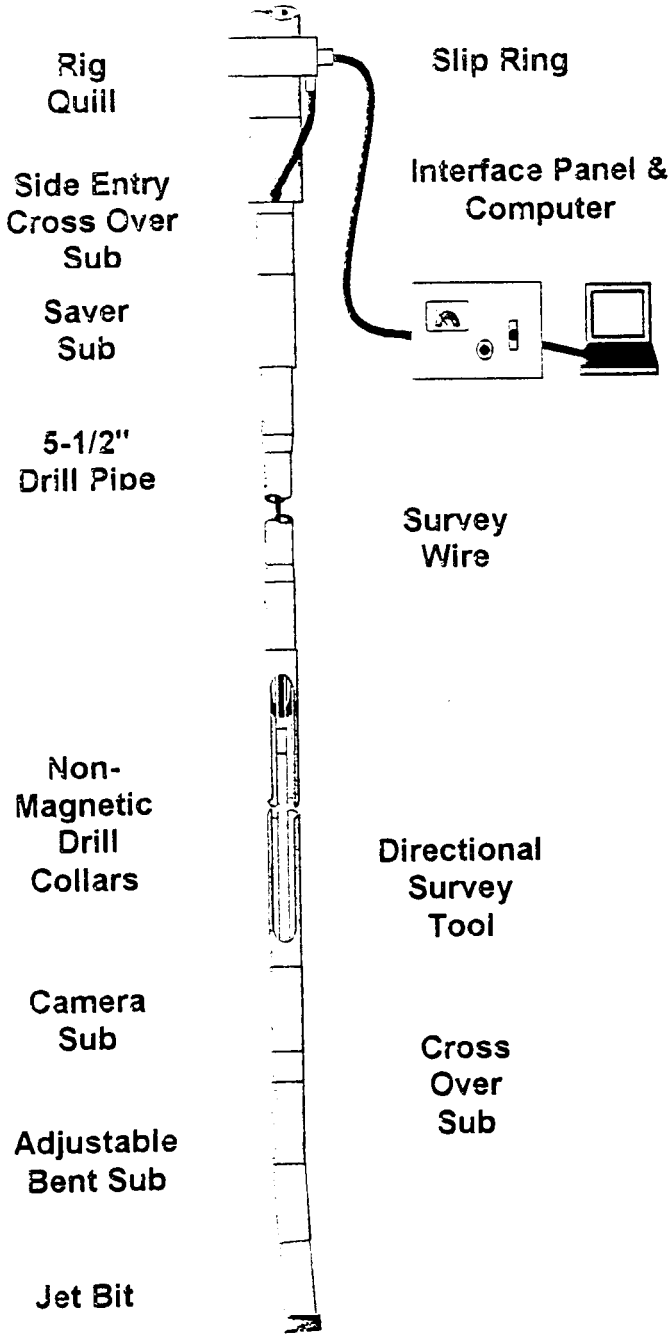
Foresight Bearing



Once the magnetic heading has been established on the proposed alignment, the drilling rig is set precisely on line with the aid of a transit.

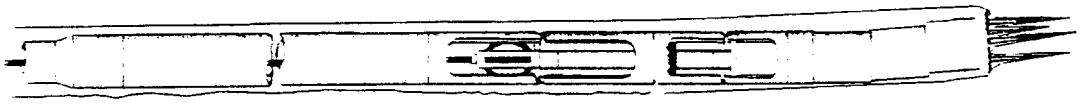
The Bottom Hole Assembly (BHA) is made up of non-magnetic drill collars to isolate the steering tool, a camera sub that holds the steering tool in place, a bent housing for directing the bit, and the jet bit.

Bottom Hole Assembly Detail



The entire BHA assembly is advanced into the ground at the entry point in front of the rig. The pilot hole is advanced linearly along a pre-determined profile. Directional deviation in azimuth and inclination are made accordingly to maintain the pre-determined inarcuate pathway.

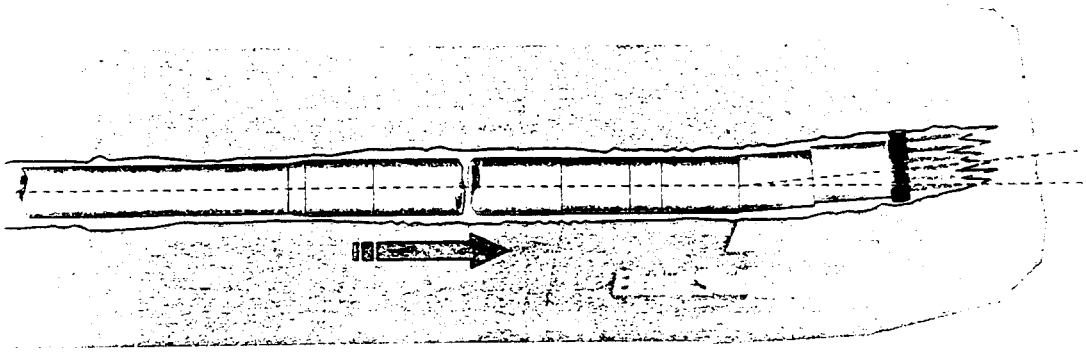
Survey Tool Location in Jetting Assembly



Surveys are taken at 15 and/or 30-foot progressions throughout the pilot hole. These are calculated and plotted on a work profile and plan drawing. This allows the survey technician to track vertical depth, horizontal distance and right/left-bearing drift at all times during the project. Tool face inclinations and bearing numbers are given every eight seconds during the course of drilling one 30-foot section of drill pipe.

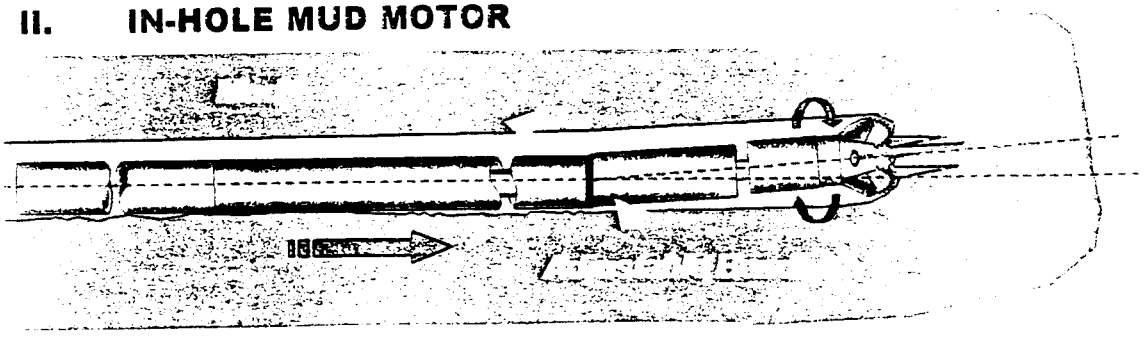
Cherrington uses two methods to penetrate formations:

I. **SPUD JET**



This method uses hydraulics to erode the formation away for penetration of softer formations like sands, silts and clays.

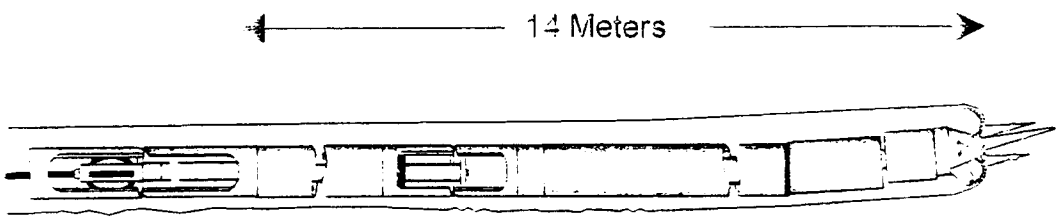
II. **IN-HOLE MUD MOTOR**



This method uses a motor based on the Moyno pump principle and represents a highly efficient hydraulic, positive displacement motor. It

converts hydraulic horsepower from the drilling fluid (volume and pressure) into mechanical horsepower (torque and rpm), that rotates the drill bit only and ,allows hole deviation to occur when used in conjunction with a bent housing. This method is used to drill harder rock formations such as sandstone, shale, limestone and granite.

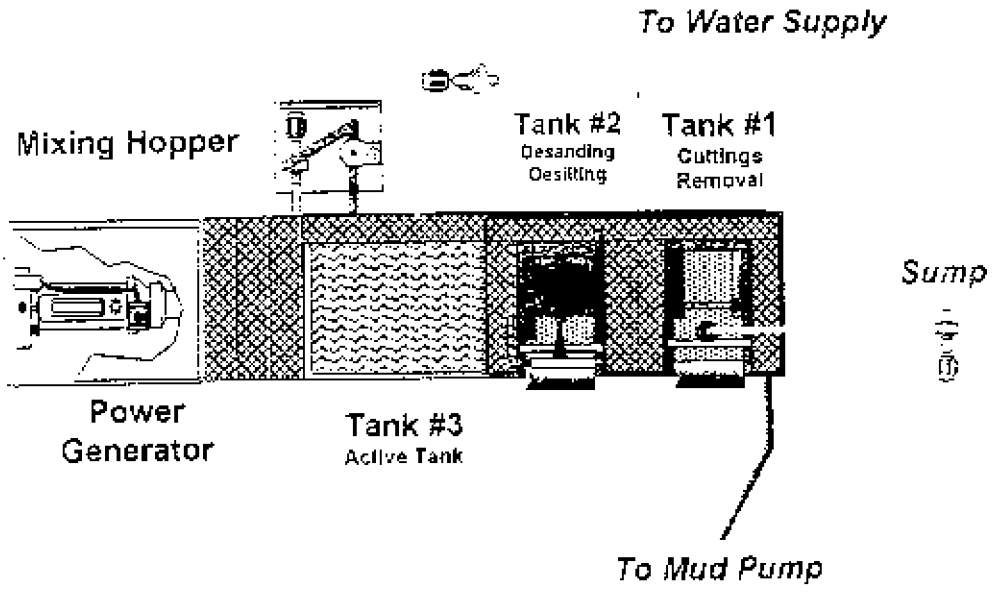
Survey Tool Location in Mud Motor Assembly



Bentonite will be used on all drilling phases of the project. The Bentonite and water slurry will have a density of approximately 8.6 pounds per gallon. This slurry will aid in suspending the drilled solids and give the bore hole lubricity in which to place the product conduit.

All Bentonite slurry or drilling mud will be mixed at the site. The Bentonite will be in bags on pallets and will be mixed in a Jet Hopper with water to produce slurry commonly referred to as drilling mud. The drilling mud pumped down the borehole returns to the surface through the annulus between the drill pipe and the formation. The solids control equipment removes the drilled solids and the clean drilling fluid is re-used. The separated solids will be removed from the site and require disposal. Excess drilling fluids will also be hauled offsite and disposed of at an acceptable disposal site.

Typical Solids Control Detail



Once the pilot hole has exited on the ocean floor, the drill pipe will be removed from the borehole and the non-magnetic BHA will be removed. The product conduit will then be pushed into the slurry-filled hole using a "Bull Nose" in place of the BHA. The "Bull Nose" acts as a guide for the product conduit to be re-inserted into the pilot hole.

As the product conduit is being pushed into the slurry-filled pilot hole, drilling fluid is pumped through the "bull nose". This aids in the further suspension of any drilled solids that may be left in the hole.

After the product conduit reaches the exit point on the ocean floor, the drill rig can be removed. The product conduit is connected into a permanent manhole that is constructed at the entry point. Once the manhole is completed, a pig can be blown down the conduit with a pull wire or rope attached.

To complete the installation, a diver will need to remove the "bull nose" from the end of the conduit on the ocean floor. The pig can then be removed along with the pull wire or rope. A bell shaped cap is installed on the end of the conduit with the pull wire or rope secured to the cap. The conduit is then ready for cable installation.

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Section 8 Special Product Information

Respiratory Protection: Use NIOSH approved dust respirators, with approval TC-21C-XXX.

Ventilation: Sufficent to keep dust levels below TLV for crystalline silica.

Protective Gloves: General duty work gloves.

Eye Protection: If high dust conditions exist, tight fitting goggles are recommended.

Other protective equipment: Eyewash

Section 9 Special Precautions

Precautions to be taken in handling and storing: Store out of weather. Product becomes slippery when wet. Avoid contact with water in walkways.

Other precautions: None.

Prepared by Parchem, Inc. January 1994

ASSOCIATE MEMBER DCCA

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Section 5 Health Hazard Data

Threshold Limit Value:
Use TLV formula for Crystalline Free Silica, OSHA permissible exposure limit 4mg/m3. Total dust, 1.5mg/m3 respirable dust. Sodium Bentonite Cas. # 1302-78-9. Free Silica Cas. # 12808-60-7.

Effects of Overexposure:
Cronic overexposure over TLV may result in Silicosis or other respiratory ailments.

Carcinogenicity:
Crystalline Silica/Alpha Quartz has been listed by the IARC as a 2A Carcinogen. IARC, 1987, concludes that there is limited evidence to suggest that overexposure to crystalline silica, through inhalation, may be carcinogenic to humans.

Skin: potential irritant
Eye: potential irritant
Inhalation: irritation to lungs, nose, and throat.

Emergency First Aid Procedures: Eyes: Flush with fresh water.
Skin: Wash with soap and water.
Inhalation: If inhaled, move to fresh air.

Section 6 Reactivity Data

Conditions contributing to instability: None, product is stable.

Incompatibility: None.

Hazardous Decomposition Products: Stable

Hazardous Polymerzation: Will not occur.

Section 7 Spill or Leak Procedures

If material is released or spilled: If uncontaminated, sweep up and re-use product.

Waste disposal method: Can be disposed of in an approved land fill.

Neutralizing Chemicals: Non Applicable.

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PAR CHEM, INC.

Material Safety Data Sheet

Pargel-220

Section 1 Product Identification

Manufacturers' Name: Parchem, Inc.
P.O. Box 2216
Laurel, MS 39440
601-649-1500

Chemical Name and Synonyms: Hydrous Silicate of Alumina/Wyoming Sodium Bentonite

Section 2 Hazardous Ingredients

Material or Component %	Hazard Data
Free Crystaline Silica 1 - 8%	Cronic Exposure over the TVL may result in Silicosis or other respiratory ailments.

Section 3 Physical Data

Boiling Point: (degrees F)	n/a	Specific Gravity: (H2O = 1)	2.6
Vapor Pressure: (mm Hg):	n/a	Vapor Density: (air = 1):	n/a
Evaporation Rate:	n/a	Solubility in Water:	negligible

Appearance and Odor: yellow, blue brown, gray granules or powder, with "earthy" odor.

Density @ 20 degrees Celcius: uncompacted: 62lb./ft.3

Hazardous Materials Identification

Health Hazard = 1 Flammability = 0 Reactivity = 0

Key, Degree of Hazard:
4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Insignificant

Section 4 Fire and Explosion Data

Flash Point: n/a Flammable Limits: non-flammable

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